

wherein R₁-R₁₀ are independently hydrogen, hydroxyl, amino, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, O-alkyl, S-alkyl, N-alkyl, O-alkenyl, S-alkenyl, N-alkenyl, O-alkynyl, S-alkynyl, N-alkynyl, aryl, substituted aryl, aryloxy, substituted aryloxy, heteroaryl, substituted heteroaryl, aralkyloxy, arylalkyl, alkylaryl, alkylaryloxy, arylsulfonyl, alkylsulfonyl, alkoxycarbonyl, aryloxy carbonyl, guanidino, carboxy, an alcohol, an amino acid, sulfonate, alkyl sulfonate, CN, NO₂, an aldehyde group, an ester, an ether, a crown ether, a ketone, an organosulfur compound, an organometallic group, a carboxylic acid, an organosilicon or a carbohydrate that optionally contains one or more alkylated hydroxyl groups;

wherein said heteroalkyl, heteroaryl, and substituted heteroaryl contain at least one heteroatom that is oxygen, sulfur, a metal atom, phosphorus, silicon or nitrogen; and

wherein said substituents of said substituted alkyl, substituted alkenyl, substituted alkynyl, substituted aryl, and substituted heteroaryl are halogen, CN, NO₂, lower alkyl, aryl, heteroaryl, aralkyl, aralkyloxy, guanidino, alkoxycarbonyl, alkoxy, hydroxy, carboxy and amino;

and wherein said amino groups optionally substituted with an acyl group, or 1 to 3 aryl or lower alkyl groups.

Please cancel claims 2 and 3 without prejudice.

4. (Amended) The method of claim 1 wherein R₅ and R₆ are hydrogen.

5. (Amended) The method of claim 1 wherein R₁-R₁₀ are independently hydrogen, hydroxyl, alkyl, aryl, arylalkyl, or hydroxyalkyl.

6. (Amended) The method of claim 1 wherein R_1 - R_{10} are independently hydrogen, hydroxyl, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, phenyl, tolyl, hydroxymethyl, hydroxypropyl, or hydroxybutyl.

7. (Amended) The method of claim 1 wherein said anthracene is selected from the group consisting of 1,2-dimethylantracene, 9,10-dimethyl anthracene, 7,8-dimethylantracene, 9,10-diphenylantracene, 9,10-dihydroxymethylantracene, 9-hydroxymethyl-10-methylantracene, dimethylantracene-1,2-diol, 9-hydroxymethyl-10-methylantracene-1,2-diol, 9-hydroxymethyl-10-methylantracene-3,4-diol, and 9, 10-di-m-tolyantracene.

8. (Amended) The method of claim 1 wherein R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 and R_{10} are hydrogen.

9. (Amended) The method of claim 1 wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 and R_8 are hydrogen.

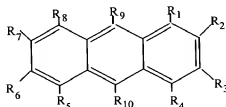
10. (Amended) The method of claim 1 wherein R_3 , R_4 , R_5 , R_6 , R_7 and R_8 are hydrogen.

11. (Amended) The method of claim 1 wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_9 and R_{10} are hydrogen.

12. (Amended) The method of claim 1 wherein R_1 , R_2 , R_5 , R_6 , R_7 and R_8 are hydrogen.

13. (Amended) The method of claim 1 wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 and R_{10} are hydrogen.

23. (Amended) A method for generating a mutation in a gene of interest comprising exposing a cell comprising said gene of interest to a chemical mismatch repair inhibitor *in vitro*, wherein said mismatch repair inhibitor is an anthracene having the formula:



23 wherein R_1 - R_{10} are independently hydrogen, hydroxyl, amino, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, O-alkyl, S-alkyl, N-alkyl, O-alkenyl, S-alkenyl, N-alkenyl, O-alkynyl, S-alkynyl, N-alkynyl, aryl, substituted aryl, aryloxy, substituted aryloxy, heteroaryl, substituted heteroaryl, aralkyloxy, aralkyl, alkylaryl, alkylaryloxy, arylsulfonfyl, alkylsulfonfyl, alkoxy carbonyl, aryloxy carbonyl, guanidino, carboxy, an alcohol, an amino acid, sulfonate, alkyl sulfonate, CN, NO_2 , an aldehyde group, an ester, an ether, a crown ether, a ketone, an organosulfur compound, an organometallic group, a carboxylic acid, an organosilicon or a carbohydrate that optionally contains one or more alkylated hydroxyl groups;

wherein said heteroalkyl, heteroaryl, and substituted heteroaryl contain at least one heteroatom that is oxygen, sulfur, a metal atom, phosphorus, silicon or nitrogen; and

wherein said substituents of said substituted alkyl, substituted alkenyl, substituted alkynyl, substituted aryl, and substituted heteroaryl are halogen, CN, NO_2 , lower alkyl, aryl, heteroaryl, aralkyl, aralkyloxy, guanidino, alkoxy carbonyl, alkoxy, hydroxy, carboxy and amino;

and wherein said amino groups optionally substituted with an acyl group, or 1 to 3 aryl or lower alkyl groups; and

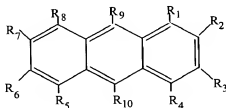
testing said cell to determine whether said gene of interest comprises a mutation.

24 70. (Amended) The method of claim 68 wherein said mutagen is selected from the group consisting of N-methyl-N'-nitro-N-nitrosoguanidine, methane sulfonate, dimethyl

sulfonate, O-6-methyl benzadine, ethyl methanesulfonate, methylnitrosourea, and ethylnitrosourea.

Please add the following new claims:

72. A method for making a hypermutable non-human organism comprising exposing at least one cell of said organism to an inhibitor of mismatch repair, wherein said inhibitor is an anthracene, wherein said anthracene has the formula:



wherein R₁-R₁₀ are independently hydrogen, hydroxyl, amino, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, O-alkyl, S-alkyl, N-alkyl, O-alkenyl, S-alkenyl, N-alkenyl, O-alkynyl, S-alkynyl, N-alkynyl, aryl, substituted aryl, aryloxy, substituted aryloxy, heteroaryl, substituted heteroaryl, aralkyloxy, arylalkyl, alkylaryl, alkylaryloxy, arylsulfonyl, alkylsulfonyl, alkoxycarbonyl, aryloxy carbonyl, guanidino, carboxy, an alcohol, an amino acid, sulfonate, alkyl sulfonate, CN, NO₂, an aldehyde group, an ester, an ether, a crown ether, a ketone, an organosulfur compound, an organometallic group, a carboxylic acid, an organosilicon or a carbohydrate that optionally contains one or more alkylated hydroxyl groups;

wherein said heteroalkyl, heteroaryl, and substituted heteroaryl contain at least one heteroatom that is oxygen, sulfur, a metal atom, phosphorus, silicon or nitrogen; and

wherein said substituents of said substituted alkyl, substituted alkenyl, substituted alkynyl, substituted aryl, and substituted heteroaryl are halogen, CN, NO₂, lower alkyl, aryl, heteroaryl, aralkyl, aralkyloxy, guanidino, alkoxy, alkoxy, hydroxy, carboxy and amino; and

wherein said amino groups optionally substituted with an acyl group, or 1 to 3 aryl or lower alkyl groups.

73. The method of claim 72 wherein R₅ and R₆ are hydrogen.

74. The method of claim 72 wherein R₁-R₁₀ are independently hydrogen, hydroxyl, alkyl, aryl, arylalkyl, or hydroxyalkyl.

75. The method of claim 72 wherein R₁-R₁₀ are independently hydrogen, hydroxyl, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, phenyl, tolyl, hydroxymethyl, hydroxypropyl, or hydroxybutyl.

76. The method of claim 72 wherein said anthracene is selected from the group consisting of 1,2-dimethylantracene, 9,10-dimethyl anthracene, 7,8-dimethylantracene, 9,10-diphenylantracene, 9,10-dihydroxymethylantracene, 9-hydroxymethyl-10-methylantracene, dimethylantracene-1,2-diol, 9-hydroxymethyl-10-methylantracene-1,2-diol, 9-hydroxymethyl-10-methylantracene-3,4-diol, and 9, 10-di-m-tolylantracene.

77. The method of claim 72 wherein R₃, R₄, R₅, R₆, R₇, R₈, R₉ and R₁₀ are hydrogen.

78. The method of claim 72 wherein R₁, R₂, R₃, R₄, R₅, R₆, R₇ and R₈ are hydrogen.

79. The method of claim 72 wherein R₃, R₄, R₅, R₆, R₇ and R₈ are hydrogen.

80. The method of claim 72 wherein R₁, R₂, R₃, R₄, R₅, R₆, R₉ and R₁₀ are hydrogen.

81. The method of claim 72 wherein R₁, R₂, R₅, R₆, R₇ and R₈ are hydrogen.

82. The method of claim 72 wherein R₁, R₂, R₃, R₄, R₅, R₆, R₇, R₈ and R₁₀ are hydrogen.